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(54) Heat dissipator for a rectifier bridge

(57) The dissipator is constituted by two finned bodies (2, 3) which can be coupled in a general configuration of an arcuate segment so as to define, with their respective facing inner sides, a space for the mounting of two respective rows of diodes (8, 9) of the rectifier bridge. Both the bodies are provided with fins (13, 14) on their facing inner sides, even in the portions between the diodes (8, 9) of the two rows.

FIG. 2

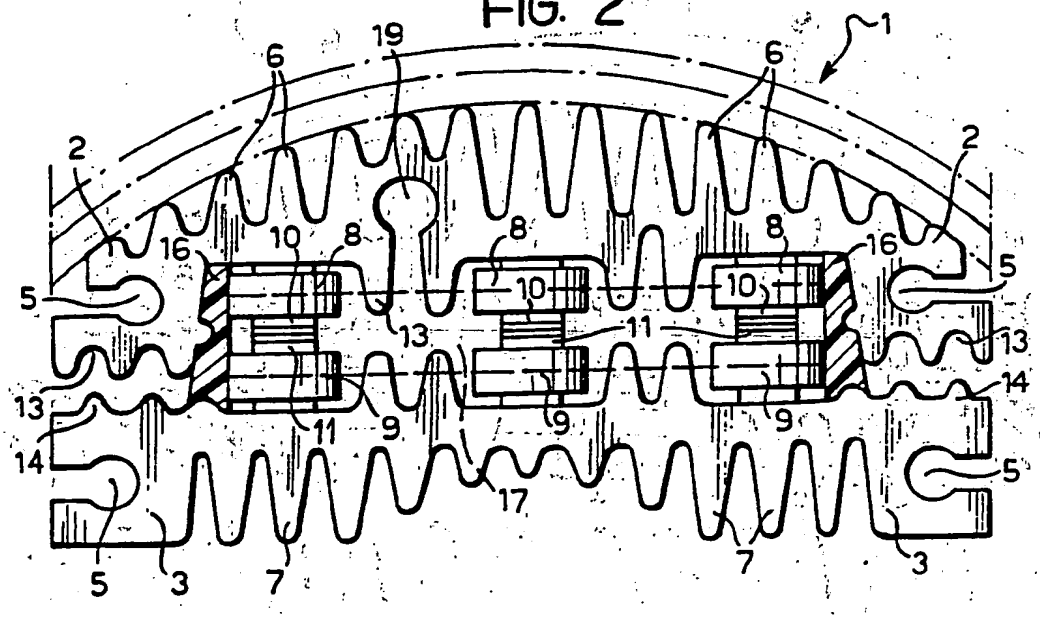

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FIG. 1

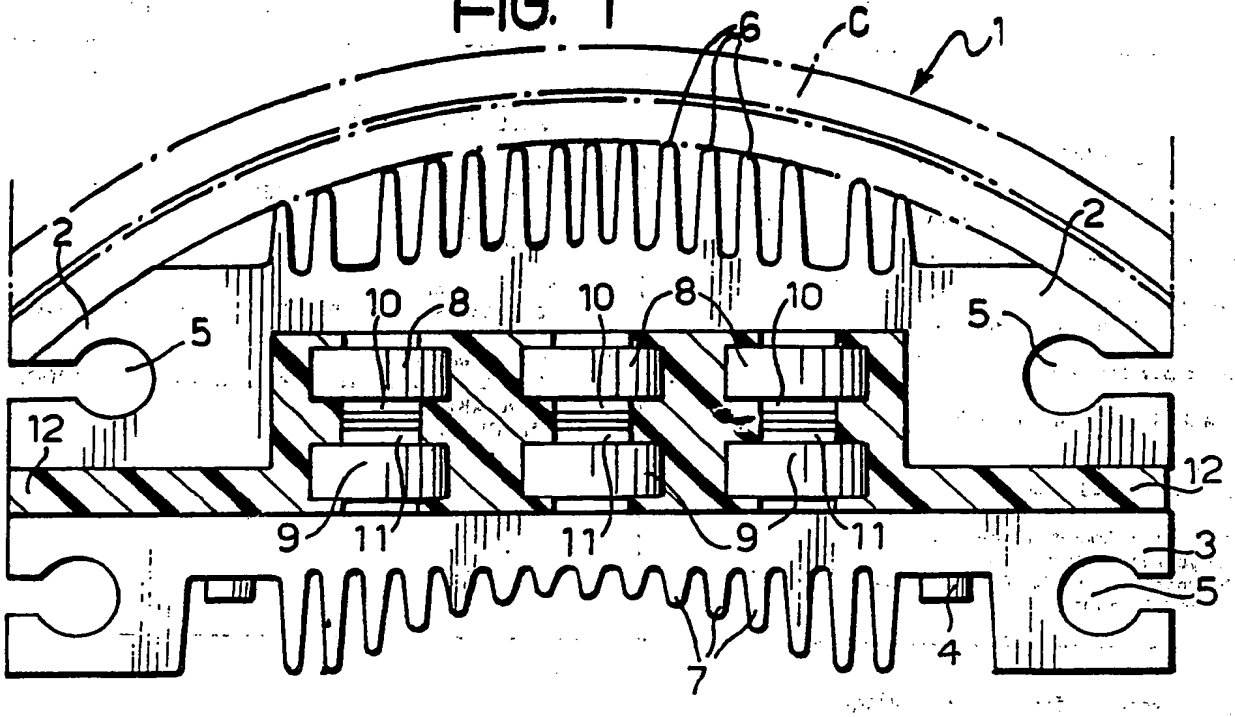

FIG. 2

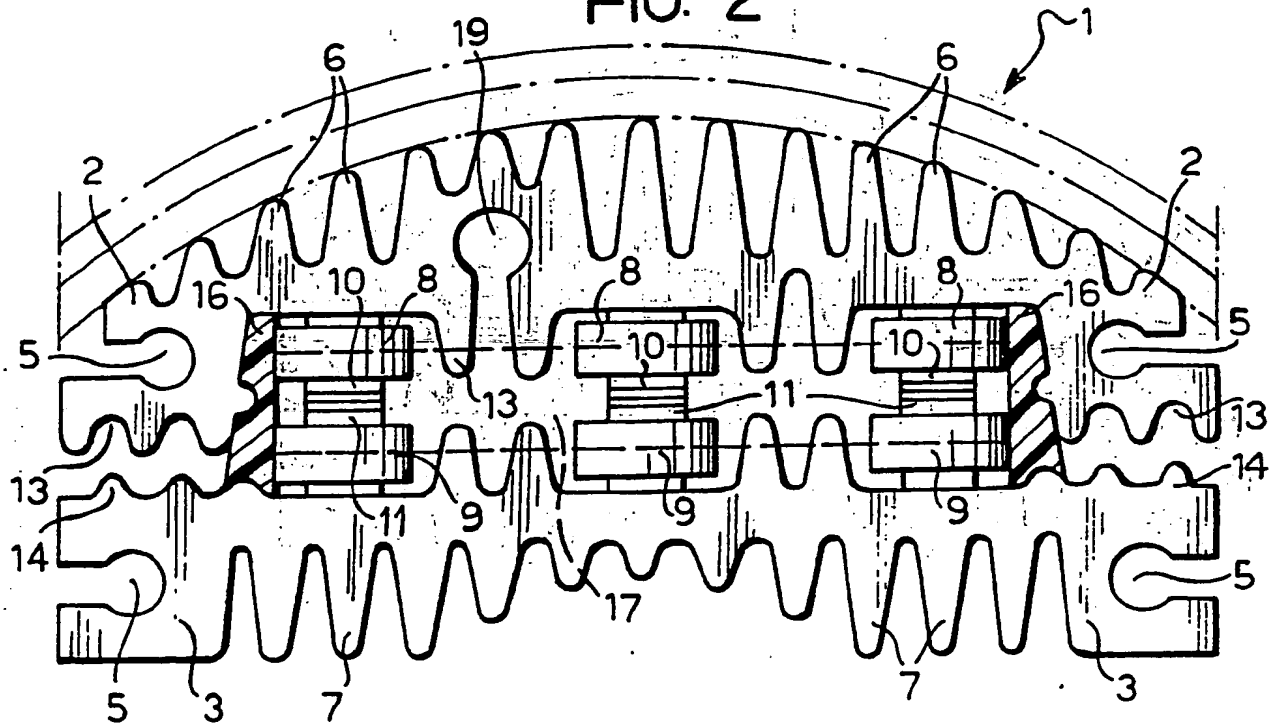

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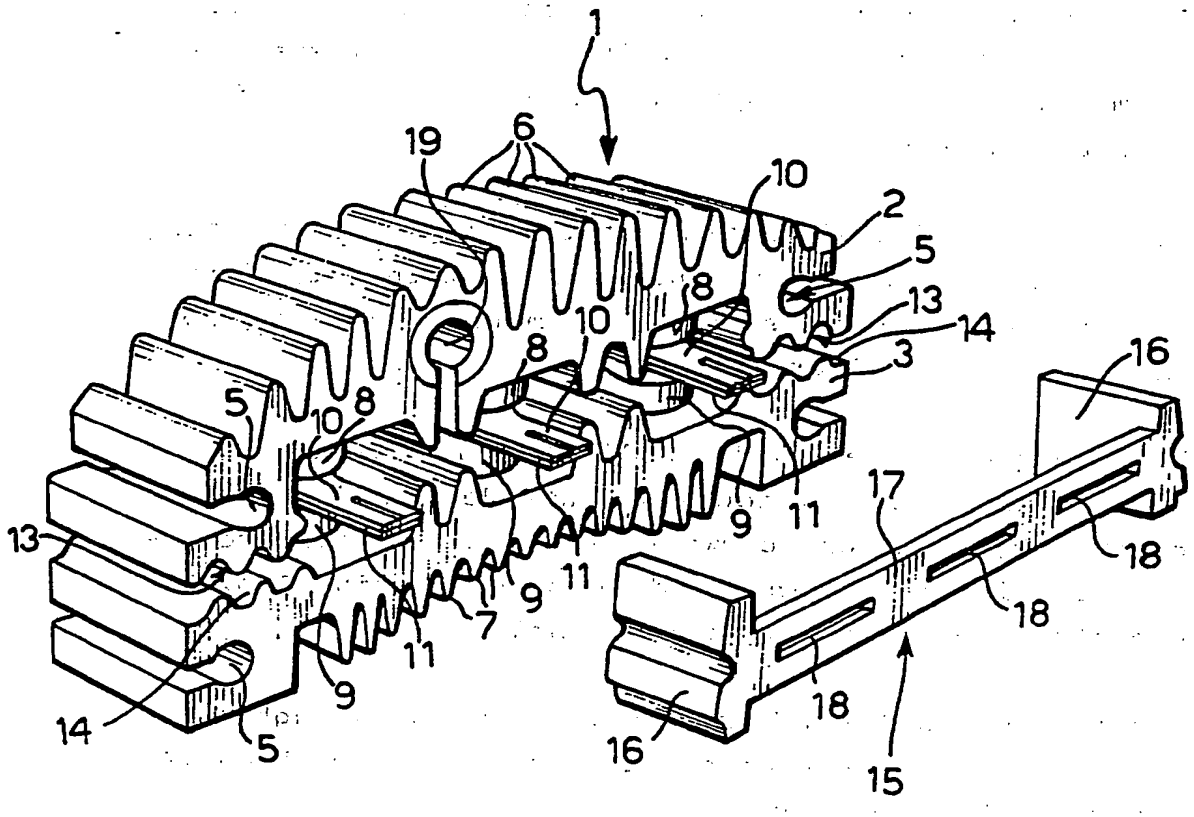
FIG. 3



"A DISSIPATOR FOR THE RECTIFIER BRIDGE OF AN ELECTRICAL GENERATOR, PARTICULARLY FOR MOTOR VEHICLE"

The present invention relates to dissipators for the rectifier bridges of electrical generators, and particularly concerns a dissipator comprising two finned bodies which can be coupled in a general configuration of an arcuate segment so as to define, with their respective facing inner sides, a space for the mounting of two respective rows of diodes of the rectifier bridge.

A front view of a dissipator of this type for mounting within the housing of a generator (alternator) fitted in a motor vehicle, such as a motor car, is shown schematically in Figure 1.

The dissipator, generally indicated 1, comprises two finned bodies 2, 3 which are intended to be coupled together by means of screws 4 so as to form an arcuate segment which can be inserted into the housing C of the generator (not illustrated as a whole).

Both the bodies 2 and 3 are provided with through-holes 5 which enable the segment unit to be clamped to the stator of the generator.

The bodies 2 and 3 are provided with external sets of fins 6 and 7, in which the heights of the individual fins vary so as to give the unit the arcuate segment shape mentioned above. In particular, the heights of the fins 6 provided on the outside of the body 2 intended to face towards the housing of the generator increase gradually towards the centre of the body 2. The heights of the fins 7 of the body 3, however, go the opposite way, decreasing little by little towards the centre of the body 3.

In this way, just as the envelope of the fins 6 of the body 2 reproduces the shape of the inner wall of the housing C in a complementary manner, the fins 7 which are intended to face towards the rotor cavity also extend with their tips arranged along a circular envelope which reproduces the shape of the cavity in question in a complementary manner.

The shape of the inner side of the body 2, which is intended to face towards the homologous side of the body 3, is recessed: consequently, when the two bodies 2 and 3 are coupled together, the inner sides (that is, the mutually facing sides) of the bodies 2 and 3 jointly define a space for the mounting of the diodes of the rectifier bridge.

The latter are arranged in two rows of three diodes, indicated 8 (on the body 2) and 9 (on the body 3) respectively.

Each diode of both rows has one of its terminals set into the metal material of the respective body (2, 3) of the dissipator in an electrically connected relationship (for example, soldered).

This is usually the cathodic terminal for the diodes 8 mounted in the body 2 and the anodic terminal for diodes 9 mounted in the body 3.

The diodes of the two rows are opposed so as to form three pairs. Further terminals 10, 11 of the facing diodes of each pair thus extend in contact with each other to form appendages which project outwardly of the dissipator 1 (for reference, see Figure 3) to act as connectors for connection to the electrical generator.

In the most usual situation of use, the latter is constituted by a three-phase alternator. Each of the rows 8 and 9 therefore comprises three diodes, the free terminal (10, 11) of each of which extends in contact with the free terminal of the corresponding diode of the other row to form a connector for connection to one of the three phases of the alternator.

With the above-described arrangement of the electrical connection of the diodes, a pseudo-direct voltage (namely, that which is obtained by the rectification of the three phases of the alternator) is established between the bodies 2 and 3 with the positive pole on the body 2 and the negative pole on the body 3. The negative pole is usually connected to earth on the body of the alternator due to the connection made by the metal fixing screws of the body 3 which are inserted in the respective apertures 5.

The "positive" body 2, however, is fixed to the stator support with the interposition of an insulating layer. The positive voltage is conducted from the casing through a stud driven into one of the apertures 5 of the body 2 of the dissipator; this stud (not visible in the drawings) extends through a corresponding hole in the casing of the alternator; forming a terminal outside the latter for the fixing of a lead.

A mass of resin 12 having an insulating function is usually poured into the space defined jointly by the inner sides of the two bodies 2 and 3, in which the diodes 8 and 9 are mounted, and the diodes 8 and 9 are buried therein with the exception of the ends of the connectors 10 and 11.

The object of the present invention is further to improve a dissipator of the type specified above, particularly as regards the possibility of increasing its outward heat-exchange action and as regards the possibility of further simplifying the assembly of the dissipator and of the generator as a whole.

According to the present invention, this object is achieved by virtue of a dissipator of the above-specified type, characterised in that the two bodies are provided with fins on their respective facing inner sides, even in the portions between the diodes of the rows.

Preferably, an insulating element intended to be fitted onto the terminals of the diodes is also provided to replace the mass of resin referred to in the introduction to the description, and is generally bridge-shaped with two shoulders for insertion into the mounting space for the diodes and a beam part which is intended to extend along one side of the mounting space without covering that side.

The fins which are also provided on the inner sides of the two bodies constituting the dissipator significantly improve the heat-exchange characteristics of the dissipator itself; the elimination of the mass of insulating resin, which is replaced by the bridge-shaped insulating element, has the purpose of enabling air to pass over the fins provided on the inner sides of the two bodies of the generator.

The invention will now be described, purely by way of non-limiting example, with reference to the appended drawings, in which:

Figure 1 shows a known dissipator and has already been described above,

Figure 2 is a front elevation substantially similar to the view of the Figure 1, which shows a dissipator according to the invention, and

Figure 3 is a partially exploded perspective view of a dissipator according to the invention.

In Figures 2 and 3 the reference numerals which correspond to those already used above with reference of to Figure 1 relate to constituent parts and elements which are substantially similar to those already described.

The main characteristic of the dissipator 1 according to the invention is the presence, even on the facing inner sides of the bodies 2 and 3, of fins 13 (body 2) and 14 (body 3) which extend to face each other directly or are interdigitated.

The fins 13 and 14 are present on the inside of the mounting space for the diodes 8 and 9 in the portions of the bodies 2 and 3 between the diodes 8 and 9 of the two rows, as well as on the end portions of the bodies 2 and 3.

An insulating element, indicated 15, is intended to be fitted onto those connecting terminals 10, 11 of the diodes 8, 9 which project from the dissipator 1 on one side of the mounting space for the diodes 8, 9.

The element 15, which is produced by the moulding of the insulating plastics material, is generally

bridge-shaped with two shoulders 16 and beam part 17.

The overall length of the element 15, that is, the distance between the two shoulders 16, is substantially equal to the length of the diode-mounting space.

The element 15 can thus be slid into the mounting space, with the terminals 10 and 11 of the diodes 8 and 9 passing into corresponding apertures or slots 18 provided in the beam part 17.

As is shown better by the broken lines in Figure 2, the height of the latter (measured radially with respect to the arcuate segment shape of the dissipator 1) is less than the corresponding dimension of the diode-mounting space.

This means that the beam part 17 of the element 15 extends along the side of the mounting space for the diodes 8, 9 from which the terminals 10 and 11 project, without completely covering the side in question.

This means that the part 17 leaves side openings free on both sides, enabling ventilating air to penetrate the mounting space for the diodes and to flow over the latter and particularly over the fins 13 and 14.

According to an embodiment which has been shown to be particularly advantageous, the connecton of the positive body to the outside is achieved by means of a stud (not shown in the drawings) inserted, for example by driving, not in one of the fixing holes 5 of the body 2, but in a further hole 19 formed in a groove portion of one of the sets of fins (usually in a position intermediate two diodes 8), so as to form a

sort of extension of the groove.

Naturally, the principle of the invention remaining the same, the forms of embodiment and details of construction may be varied widely with respect to those described and illustrated, without thereby departing from the scope of the present invention.

CLAIMS

1. A dissipator for the rectifier bridge of an electrical generator, comprising two finned bodies which can be coupled in a general configuration of an arcuate segment so as to define, with their respective facing inner sides, a space for the mounting of two respective rows of diodes of the rectifier bridge, characterised in that the two bodies are provided with fins on their respective facing inner sides, even in the portions between the diodes of the rows.

2. A dissipator according to Claim 1, in which the diodes are provided with respective connection terminals which can project from the two coupled bodies on one side of the space for the mounting of the diodes characterised in that an insulating element is provided which is intended to be fitted onto the terminals and has a generally bridge-like configuration with two shoulders for insertion into the mounting space for the diodes and a beam part which is intended to extend along the side of the mounting space without covering the side.

3. A dissipator according to Claim 2, characterised in that through-holes for the terminals of the diodes are provided in the beam part of the insulating element.

4. A dissipator according to any one of Claims 1 to 3, characterised in that at least one of the bodies has a hole for the insertion of a contact terminal.

5. A dissipator according to Claim 4, characterised in that the insertion hole is formed in correspondence with the said fins on the respective facing sides.

6. A dissipator according to Claim 4, characterised in that the insertion hole constitutes an extension of a groove between the said fins on the respective facing sides.

7. A dissipator according to Claim 4 or Claim 5, characterised in that the insertion hole is in a position intermediate the diodes of one of the respective rows.

8. A dissipator for the rectifier bridge of an electrical generator substantially as hereinbefore described with reference to Figures 2 and 3 of the accompanying drawings.

9. The use of a dissipator according to any one of Claims 1 to 8 in an electrical generator which is intended to be fitted in a motor vehicle.